introducing FIGS. 1(a) and 1(b) that the "[t]he invention will first be introduced with an example based on QPSK modulation" (Specification, page 5, lines 24-25). FIG. 1(a) indeed shows a conventional QPSK constellation, and FIG. 1(b) shows a rotated QPSK constellation of the type that may be utilized in conjunction with the invention. Utilizing the rotated constellation of FIG. 1(b) in accordance with the techniques of the invention allows improvements over prior art techniques such as that described in the G.M. Durant et al. reference cited at page 6, lines 2-5.

Similarly, FIG. 2 shows a possible mapping utilizable in conjunction with the invention, and serves as a basis for the illustration of the selector structure of FIG. 3, as indicated at page 7, lines 20-26 of the specification:

> FIG. 3 illustrates a basic selector structure for implementing the above-noted selection operation, i.e., the selection process for a QPSK modulation that leads to a complex multiplication according to the table of FIG. 2 and Equations (5) through (8) above. The basic selector structure includes inverters 10-1 and 10-2, and switches 12-1 and 12-2, interconnected as shown. As is apparent from FIG. 3, the selection operation does not require any multiplication or addition. Instead, a two's complement logic is assumed as well as some basic logic to control the selectors based on the values of bits b_0 and b_1.

Applicants therefore submit that FIGS. 1(a), 1(b) and 2 simply provide a basis for certain illustrative embodiments of the invention. The proposed relabeling will take these figures out of their appropriate context, and is therefore believed to be improper.

In order to clarify the teachings of the G.M. Durant et al. reference cited on page 6 of the specification, Applicants have submitted herewith a Supplemental Information Disclosure Statement including a copy of the reference. Applicants respectfully submit that the reference be considered by the Examiner and made of record in the present application.

With regard to the §103(a) rejection over Seshadri and the admitted prior art of page 6 of the specification, Applicants direct the Examiner to page 1016, column 1, first full paragraph of the G.M. Durant et al. reference, which states as follows with emphasis supplied:

Since we propose QPSK modulation, implying detected and known symbols of value $\pm 1 \pm j$, the feedback filter becomes multiply-free as the traditional multiplies in the filter convolution become additions.

As noted by the Examiner, Applicants acknowledge that G.M. Durant et al. teach that "using $u_i \in (\pm 1 \pm j)$ rather than $u_i \in 1/\sqrt{2}\,(\pm 1 \pm j)$ saves complexity since multiplications can be performed as add/sub operations" (Specification, page 6, lines 2-5). However, Applicants go on to state that the present invention provides further simplification using the rotated constellation of FIG. 1(b) by reducing the number of operations that would otherwise be required (Specification, page 7, lines 14-15). A more particular example is provided by Applicants in conjunction with the table of FIG. 10. It can be seen from FIG. 10 that the techniques of the invention result in a decrease in the number of operations, rather than simply a conversion of multiplication operations to addition operations as in the G.M. Durant et al. reference. For instance, with reference to the line of the table in FIG.10 corresponding to QPSK modulation, the invention replaces a total of (4M-2) additions and 4M multiplications with a total of 2M-2 add/sub operations. This is a reduction in the number of operations, rather than simply a conversion of multiplication operations to addition operations as in the G.M. Durant et al. reference.

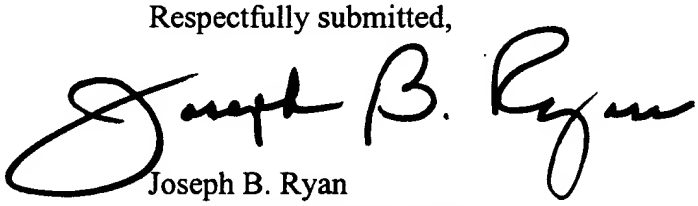
Each of the independent claims 1, 12, 23, 24 and 25 specifies that a first modulation constellation corresponding to a rotated version of a second modulation constellation allows the performance of a signal processing operation in a receiver of a digital communication system "using a reduced number of operations relative to the number of operations required in conjunction with the second modulation constellation." The admitted prior art cited by the Examiner indicates only that the G.M. Durant et al. reference teaches that multiplication operations can be replaced with other operations, but does not indicate a reduction in the number of operations. This interpretation is supported by the above-cited portion of the G.M. Durant et al. reference. The claimed invention requires a reduction in the number of operations, and this limitation is not met by Seshadri, the admitted prior art, or the G.M. Durant et al. reference, taken in any combination.

Dependent claims 2-11 and 13-22 are believed allowable for at least the reasons identified above with regard to their respective independent claims. These dependent claims are also believed

to define additional patentable subject matter not found in the combined teachings of Seshadri, the admitted prior art, and the G.M. Durant et al. reference.

In view of the above, Applicants believe that claims 1-25 are in condition for allowance, and respectfully request withdrawal of the drawing objection and §103(a) rejection.

Respectfully submitted,



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